

We Claim:

1. A bender structure piezoelectric device having an additional laminate layer of a piezo-resistive material the function of which is for sensing and responding to the actual deflection of the bender device.
2. A piezoelectric device as claimed in claim 1, wherein in operation an associated control system applies a voltage and detects the change in current and thus resistance, or applies a current and detects the change in voltage.
3. A piezoelectric device as claimed in claim 1, wherein said additional laminate layer is arranged to be the layer closest to the neutral axis of the bender, generally near the centre of the bender layer-stack.
4. A piezoelectric device as claimed in claim 1, wherein there are two or more said additional laminate layers, disposed in such a manner as to minimise hysteresis effects therein by arranging for some cancellation of the hysteresis effects between the layers when used in combination.
5. A piezoelectric device as claimed in claim 4, wherein there is included a differential amplifier used in operation to sense the difference of the output signals from the two or more said additional laminate layers and to provide a net signal therefrom that more precisely indicates the actual deflection of the bender.
6. A piezoelectric device as claimed in claim 4, wherein the two or more said additional laminate layers are each arranged to sense in use the strain in the bender, whereafter, by suitable electronic techniques, their deflection sensitive signals may be made to add, while their temperature dependent and other non-strain-related resistance changes may be made largely to cancel.

7. A piezoelectric device as claimed in claim 1, wherein piezoelectric device comprises several layers of piezoelectric material bonded together into a laminate with said additional laminate layer also bonded into the laminate.
- 5 8. A piezoelectric device as claimed in claim 1, wherein, in order to achieve better linearity of the piezoresistive sensing layer around the zero strain point of the bender, said additional laminate layer is bonded to the piezoelectric device, in the post-sintering method of construction, the piezoelectric device is maximally deflected in the direction that would normally apply compressive strain to the
- 10 piezoresistive layer, and the bender deflection maintained until the bonding process is complete.
9. An acoustic transducer incorporating a piezoelectric device as claimed in claim 1, wherein the piezoelectric device is arranged to produce movement of air,
- 15 and thus sound waves, in response to an input drive voltage.